

ON THE GENERIC DELIMITATION OF SOME
SOUTH AFRICAN ASTEREAEE

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It is no novelty that within the Astereae the generic concept is quite unsatisfactory, even if the difficulties only appear from time to time in the very diverse treatments in the literature. Then often we are faced with one or two contrary choices. One possibility is to merge everything with one supergenus — for instance *Aster* — and to miss the opportunity of a clear division in different genera. Such a procedure is justified as long as there is the conviction that all characters which are used till now for generic delimitation do not satisfy the requirements for a more stringent subdivision. The other possibility is to recognize certain different genera, in our case in *Aster* s. l., if there are reasons weighty enough to do so. That means to make an attempt to get in such a way new smaller entities. This attempt requires, besides a critical examination of all old characters, the search for new valid arguments for the generic separation.

My investigations on South African Asters — if we want above all to call them still "*Aster*" — showed very fast that this problem of generic delimitation would be one of the cardinal points of my work. Fig. 1 shows some genera which HARVEY distinguishes in SONDER's and his *Flora Capensis* and its main characters.

This survey shows that in this field the separation of the genera mainly is based on characters of the pappus. In detail there will be distinguished between pappusbristles which are scabrous or those which are feathered, which are in one or two rows and which may or may not be present at the ligular florets. The result of a critical investigation of some very related taxa in this respect showed the following valuation of these features.

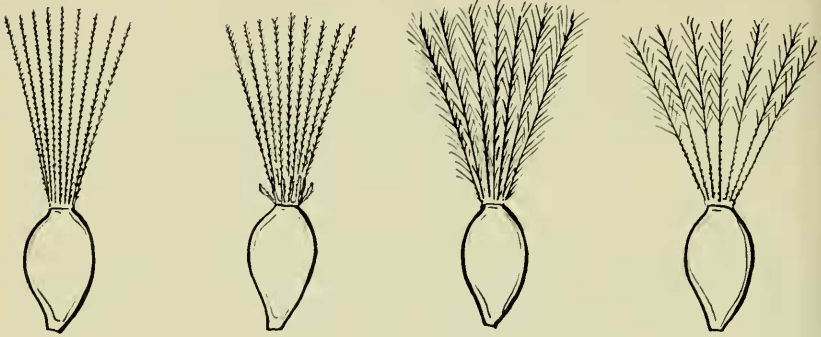
In *Aster* sensu HARVEY you can find every gradation from very fine scabrous to barbellat pappusbristles. *Mairia* and as it seems *Charieis* have a plumose — that means feathered — pappus. But obviously there are some differences in the way as in those two genera the pappus is feathered. In *Mairia* the feathers start near the basis, in *Charieis* not before the middle of the bristle. The second problem concerns the number of pappus-rows. An exact examination shows that the shrubby "Diplopappi" really have — in a variable extent — some short scales. But these scales are normally between, not in front or behind the larger bristles. Besides this there are some very related species which have only long bristles. The other

ASTER

DIPLOPAPPUS

MAIRIA

CHARIEIS



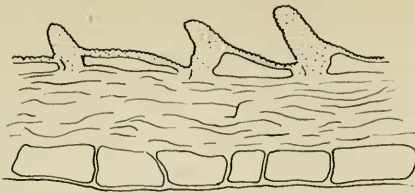
Pappus present at the ligula: florets

No pappus at the ligular florets

Fig. 1

part of "Diplopappus" (some southeastern herbaceous species) have a real outer ring of pappusbristles. We have to postpone the valuation of these results until the discussion of further characters. It is relatively easy to judge the presence of a pappus at the ligular florets (*Charieis*). In *Aster* or *Felicia*, as we in anticipation better now want to call most of the South African Asters, some of the most derived species are sometimes nearly only separated by the presence or lack of the pappus at the ligular florets (*F. namaquana* and related species). In a few cases even in one species the presence of a ligular pappus changes from population to population (*F. bergerana* p. e.). Such a "negative character" therefore proves as expected to be of only little value. We will allow it only with additional arguments. Very often it is only species-separating.

But what does bring the search for new and better characteristics? To begin with, it seemed reasonable to examine the nearly neglected achenes. The examination comprised the whole shape, the structures of epidermis and the hairs of the achenes. First of all there was one group of 6 taxa with hairless and very typical achenes of a strange shape. In this case the achenes have a horny caplike pappus-basis at the top. Taxa with such fruits show a tendency of sterility of the disk florets besides other characters. One of the many new genera of CASSINI in the Asteraceae, the genus *Polyarrhena*, belongs to this group. None of the other species we speak of now has achenes with such a top. Looking at the epidermis of the achenes we can state that species, which as we think belong to *Felicia*, have an epidermis which is \pm smooth up to covered with very fine scales (Fig. 2). These scales often do not occur before full maturity or fail to appear at all (in the same species). In comparison with this, *Mairia* (at least the species which are more similar



longitudinal section through the achene of *Felicia elongata* (Thunb.) O. Hoffm.



longitudinal section through the achene of *Mairia taxifolia* DC.

Fig. 2

to *Felicia* in habit) has an epidermis with "plaster"-like larger cells so that we have a quite different structure. *Charieis* and the shrubby "Diplopappi" have the same structure as *Felicia*.

The very typical twin-hairs on the achenes of the Astereae (more precise of the *Aster*-related species) are on a world wide scale very similar (compare QUATRECASAS 1969).

ACHENE-HAIRS

<----- FELICIA -----> herbaceous «DIPLOPAPPI» <----- MAIRIA -----> <----- MAIRIA ----->
 group I group II

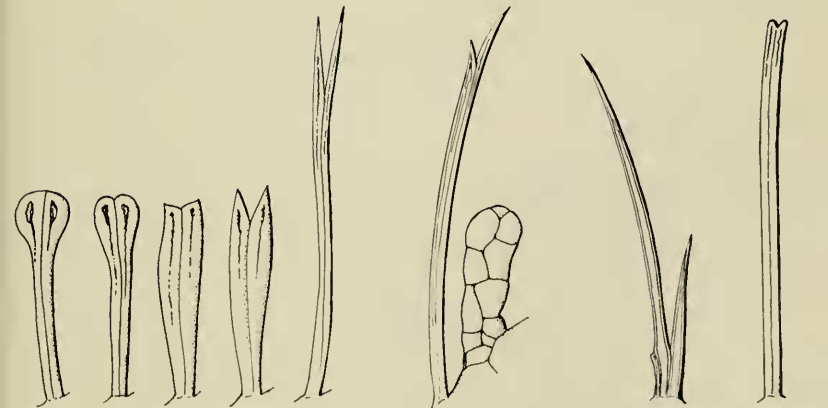


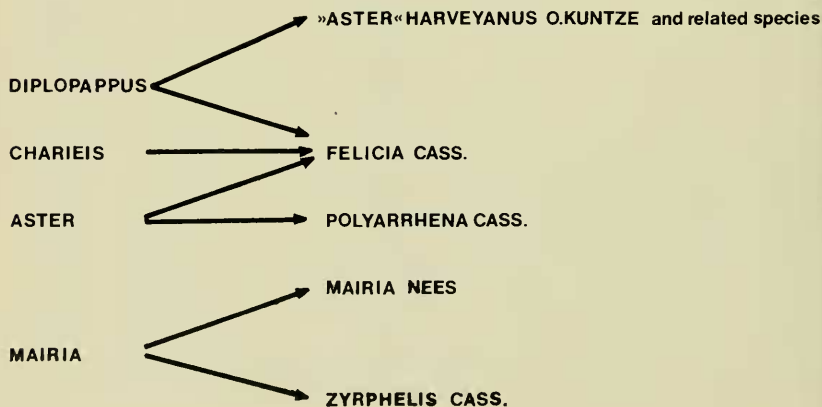
Fig. 3

These twinhairs show in Southern Africa a quite astonishing diversity (Fig. 3). In *Felicia* you can find some modifications while the probably older taxa have the more original hairtype. This means that those hairs look like those ones in the rest of the Astereae. But if we look at one group of the genus *Mairia* — the species with a scapose inflorescenc — so it is quite doubtful if we could call there the achene-hairs twin-hairs at all because one cell is very reduced. The herbaceous "Diplopappi" posses besides twin-hairs multi-cellular glands on the achenes, a very uncommon feature in the Astereae.

If we want to combine and compare all the results of the examination of all the characters we can formulate the following statement (only valid for the genera we speak of).

1. The lack of a pappus on the ligular florets is no criterion for generic delimitation.
2. The occurrence of short pappusbristles between the normal and long-ones also gives no possibility for the separation of the genera.
3. The occurrence of shorter pappusbristles behind the long-ones may be of importance, especially in connection with other good characters.
4. The kind of the pappusbristles (if plumose or only barbellate or less) may be characteristic, but not schematically as a separated character. So we can state in connection with point one that the monotypic genus *Charieis* is to be included in *Felicia*. A further hint may be the astonishing similarity of *Charieis heterophylla* with *Felicia namaquana* which also has the same in this group quite uncommon chromosome number of $2n = 10$. The different South African genera of Astereae mostly have the basicnumber $x = 9$, some derived species of *Felicia* show a decrease over $x = 8$, $x = 6$ to $x = 5$.
5. The structure of the epidermis of the achenes — included the hairs — may make a contribution for the separation of the genera.

From this results the proposal of a new distribution and definition of the treated species in the following manner:



As you see there is still lacking a valid generic name for the herbaceous "Diplopappi".

Ending this I want to emphasize that achene-characters also may give arguments to separate *Felicia* from the remaining Asters. North-American Asters for instance have 3—4-ribbed achenes. But for a definitive elucidation more work is necessary on this basis. One sentence is still to be said about a second "negative character": the lack of ligular florets. Looking through more samples you may see that this also sometimes occurs on usually ligular species. Other important characters give reason to separate *Nolletia* and *Chrysocoma* from *Felicia*, but the separate taxonomic existence of *Fresenia* still must be proved. Two questions may be anticipated answered. Firstly, palynology gives as it seems no possibilities in this group to separate the genera and, secondly, differences in the shape of the appendix of the style of the disk florets only contributes to specific differentiation.

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